

Math 420, Spring 2017

Second Team Homework

due Thursday, 2 March, 2017

Exercise 1. For each of the years ending December 31 of 2012-2016 use one-year histories with uniform weights to compute \mathbf{m} and \mathbf{V} for the risky assets in group (A), in groups (A) and (B) combined, and in groups (A), (B), and (C) combined. (This is the same exercise as last time!)

Exercise 2. Assume that the safe investment for each year is the U.S. T-Bill rate available at the beginning of that year. Assume that the credit-line for each year is three points higher than the U.S. T-Bill rate. For each \mathbf{m} and \mathbf{V} computed in Exercise 1 compute the tangency portfolio allocations \mathbf{f}_{st} and \mathbf{f}_{ct} whenever they exist. Present these in three tables (one for group (A), one for groups (A) and (B) combined, and one for groups (A), (B), and (C) combined) that lists years and the allocations for each asset rounded to the nearest thousandth. Identify when each of these portfolios exists and when it does determine if it is long or solvent. Comment on the implications of what you find.

Exercise 3. For each year graph in the $\sigma\mu$ -plane:

- the three efficient frontiers associated with the appropriate \mathbf{m} and \mathbf{V} were computed in Exercise 1 and the tangency portfolios computed in Exercise 2;
- the volatility and return mean for that year of each asset, including the risk-free assets;
- the volatility and return mean for that year of those tangency portfolios computed in Exercise 2 that exist.

There should be 5 graphs — one for each year — each with three efficient frontiers, eleven assets, and up to six portfolios plotted. Use different symbols or colors to distinguish points associated with the different groups (A), (B), and (C). Comment on any relationships that you see between the objects plotted on each graph. (This will be easier to do if you use the same scales for each of the graphs. Each σ -axis should begin at $\sigma = 0$.)